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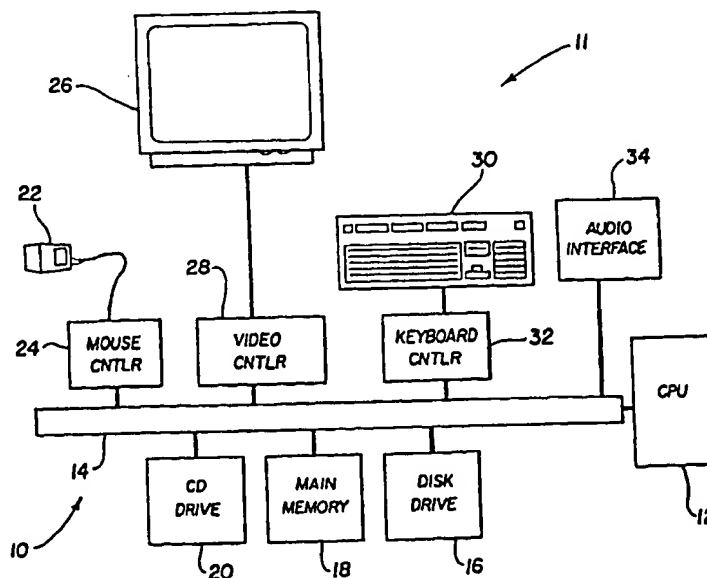
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(54) Title: **COMPUTER EDUCATION AND EXECUTION INTERFACE OPERABLE OVER A NETWORK**



(57) Abstract

A computerized, multimedia education and execution interface system (11) and method for educating and entertaining a student user according to a teacher user's options. The system (11) incorporates the education techniques of video segments (18, 20, 28), on-line student and/or teacher activity, written instructions, student's activity monitoring, student rewarding and education and entertainment program content filtering. The environment uses various input devices including a mouse (22, 24) and a keyboard (30, 32). Compact disk drive (20) with main memory (18) and disk drive (16) store the various programs and education data. An audio interface (24) and video controller (28) and screen (26) with a central processing unit (12) communication over a bus (14) completes the system (11).

**COMPUTER EDUCATION AND EXECUTION INTERFACE
OPERABLE OVER A NETWORK**

Technical Field

The present invention relates to an execution system for performing educational or entertainment operations and for providing a generic interactive educational environment capable of monitoring and rewarding the learning activities of a student, the system being
5 configurable to the preferences of educators, teachers, parents or policy makers.

Background of the Invention

For many years, application programs, on-line services, and other computer application software have been available for use with computers. Such application programs
10 perform word processing functions, numeric functions, database functions, accounting functions, inventory control functions, and a wide variety of other functions. These programs served not only to increase the efficiency of their user but to increase the user's accuracy as well. On-line services allowed a user to access large databases of information that could be downloaded and used as desired.

15 For many years, educational and entertainment application programs have been available for use with personal computers. Educational and entertainment programs served to teach some particular skills to its user in a wide range of domains, like psycho-motricity, to four-year-old children or continued education for senior-citizens.

But educational and entertainment programs generally limited to teach only one or
20 a small group of related skills, and constitute self-contained, non-modifiable software entities. Although such limited programs can be efficient in some cases where a well-defined, isolated skill is to be learned, educators such as parents, ministers or teachers are unable to provide any form of specific input to the educational and entertainment programs.

video player. The teaching aid merely displays to the user a proper sequence of keystrokes and/or mouse movements that would be required to execute specific functions and does not provide interaction between the user and the actual application program.

Even when a user becomes proficient in the use of an application program, the user
5 must provide all content to documents produced by the application program. Thus, the training performed and expertise gained typically has no relationship to particular job tasks to be performed. Some application programs included wizard applications that aided the user in performing certain tasks within the application programs.

Thus, there lies a need for a multipurpose education and entertainment interface that
10 would allow complete interactivity, locally or remotely, in real-time or not, between a student, child, pupil and a teacher, parent, minister or educator, based on expandable educational and entertainment programs and resources.

Summary Of The Invention

15 The invention described herein overcomes the above-described limitations of the prior tutorials, application program interfaces and execution systems. Provided is a computer-implemented tutorial system configurable by a teacher and for teaching a student. The system has a resource thesaurus in communication with a student user interface component and a teacher interface component. The resource thesaurus has a plurality of
20 goal-oriented programs configurable by a student or a teacher.

The student user interface component is for transmitting and receiving a set of instructions from and to the student. The instructions are based upon at least one goal-oriented program of the plurality of goal-oriented programs, the selected instructions designating at least one goal-oriented program from the plurality of goal-oriented programs.

Detailed Description of a Preferred Embodiment

In the following description, certain details are set forth to provide a complete understanding of the present invention. It will be apparent to one skilled in the art, however, that these specific details are not required in order to practice the present invention. Also, well known electrical structures and circuits are depicted in block diagram form so as not to obscure the present invention unnecessarily.

The descriptions which follow are presented in part in terms of operations within a computer. These descriptions and representations are the means used by those skilled in the software arts to most effectively convey the substance of their work to others skilled in the art.

An algorithm is here, and, generally, conceived to be a self-consistent sequence of steps leading to a desired result. These steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It proves convenient at times, principally for reasons of common usage, to refer to these signals as, values, symbols, characters, display data, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely used here as convenient labels applied to these quantities.

Further, the manipulations performed are often referred to in terms, such as comparing, commonly associated with mental operations performed by a human operator. No such capability of a human operator is necessary, or desirable in most cases, in any of the operations described herein which form part of the present invention, since the operations are machine operations. Useful machines for performing the operations of the present invention include general purpose digital computers or other similar devices. The present

A system 10 embodying the principles of the present invention is shown by way of illustration in FIGS. 1-4. The system 10 of the present invention is implemented on a typical computer system 11 as shown in FIG. 1. This computer system 11 typically comprises a CPU 12, a computer bus 14, a disc drive 16, main memory 18, a compact disc drive 20, and
5 user interface components. These user interface components preferably comprise a mouse 22 and mouse controller 24, a video display 26 and video display controller 28, and a keyboard 30 and keyboard controller 32. Preferably, the computer system 11 also includes an audio interface 34 that transmits audio information to and receives audio information from a user of the system.

10 As one skilled in the art will appreciate, the system and method of the present invention are implemented on the computer system 11 but are not readily identifiable as specific components of the system. Those skilled in the art will readily understand how the described invention may be implemented on any of a variety of computer systems. Therefore, the implementation of the system on a particular hardware platform will not be
15 more fully described herein.

Referring now to FIGS. 2 through 4, a computerized, multimedia tutorial interface system 10 for training a user to use computer application software comprises control display means 40, instruction input means 42, instruction interpretation means 44, audiovisual enablement means 46, computer application software interface means 48, and computer
20 application software control means 50.

Referring specifically to FIGS. 2 and 3, the control display means 40 comprises a control bar 51 and a topic selection screen 53, each of which are selectively displayed on the computer screen 26. Together, the control bar 51 and the topic selection screen 53 provide a plurality of instructions to a user that may be selected by the user. As is shown, the
25 control bar 51 preferably has commands similar to those found on a video tape player,

Still referring to FIGS. 2 and 3, the audiovisual enablement means 46 operates to receive execution instructions from the instruction input means 44, to selectively retrieve audiovisual information responsive to the execution instruction, and to display the audiovisual information on the computer screen 26. Preferably, the audiovisual information
5 comprises a video clip that is retrieved from a compact disc via the CD drive 20 or the data link. The video clip is then decoded, formatted, and displayed on the computer screen 26 in a video window 55. The video window 55 may cover only a portion of the computer screen 26 or may be expanded to be as large as the screen. Preferably, as is shown in FIG. 3, the video window 55, the control bar 51, and the topic selection screen 53 all reside on
10 top of the computer application software window 57 when they are active. However, when they are inactive, they are all hidden. Further, in the preferred embodiment, the topic selection screen 53 is displayed only when certain user instructions are executed.

In a typical use of the tutorial interface system, the user 49 selects a specific video clip that corresponds to a particular topic and topic to be learned. The video clip is then
15 retrieved and displayed on the computer screen 26 in the video window 55. After the information has been displayed, and, if the process has not been aborted or otherwise interrupted by the user, control may be returned to the user or be given to another system
10 component. In the preferred embodiment, immediately after the video clip has been displayed, or during a user 49 initiated break in the video clip, control is taken again by the
20 computer application software interface means 48. However, the system 10 may also be operated such that the computer application software interface means 48 takes control during a video clip, halts the video clip to demonstrate a function or service feature, and then later restarts the video clip.

The computer application software interface means 48 also receives execution
25 instructions from the instruction interpretation means 44. The computer application

which provide feedback to the user when the user has control of the computer application software. Specifically, the instruction monitoring means 52 monitors the user instructions issued to the computer application software, keeping track of the instructions. When activated, the error message issuance means 54 issues an error message to the user on the computer screen 26 if the user issues instructions that are erroneous. To determine whether the issued instructions are erroneous, the error message issuance means 54 compares the user's issued instructions to a list of correct instructions. Further, when activated, the evaluation means 56 evaluates the instructions issued to the computer application software by the user and issues a summary of the user's performance in issuing the instructions. Thereby, the evaluation means 56 provides an indication of the user's performance in learning to use the computer application software. As one skilled in the art will readily appreciate, the user instruction monitoring means 52, error message issuance means 54, and evaluation means 56 are all preferably implemented as a combination of software instructions and executed accordingly.

Referring specifically to FIG. 4, the operation of the tutorial interface system 10 is described. In the description of the system 10 operation, each relevant system event is identified with a numeral in parentheses. Immediately after the system 10 is started (100), the interface with the computer application software is initiated, and the control bar 51 and video window 55 are created (102). Next, the interface between the main program and the communication agent is established (104), and the communication agent is loaded into main memory 18. At this point, the product logo is displayed, and an introduction video segment may be played (108) on the computer screen 26. The system 10 then prompts the user to enter an instruction from the control bar 51. Immediately upon entering the program, a topic index is set to a predetermined value and a topic index is also set to a predetermined value. When the program is run for the first time, these two indexes are set at one.

The PAUSE instruction (144) causes the currently-playing video clip, if one is playing, to stop for later continuation (146).

The PLAY instruction (148) first causes the topic counter to increment (150). The topic counter indexes the relevant video clip and communication agent instructions. The next video clip is then played in the video window 55 (152). Then, the control bar 51 and the video window 55 are hidden, and the communication agent instructions may be executed (154). A notification of play is transmitted to the communication agent (156), the order is received by the communication agent (158), and instructions are read from the communication agent library and executed within the computer application software (160). Once the instructions are completed, a backwards notification is sent (162) so that the control bar 51 and the video window 55 are again displayed (164). Next, a short, written synopsis of the demonstration that was executed is displayed to the user 49 on the computer screen 26 (168). Then, the computer application software interface means 48 allows the user to practice within the computer application software to enforce what he or she has learned (168). Then, the user's performance is evaluated (170).

The COUNTER INFO instruction (172) toggles the time information displayed between elapsed time from the start of the video clip to the time remaining in the video clip (174). Optionally, the counter could also display the time since the user 49 logged on or the clock time. The counter hide instruction (176) toggles the counter display between being hidden or displayed (178).

The system 10 of the present invention can be easily implemented with application programs, on-line services, or any computer application software. The system 10 is generic and provides a familiar training interface that can be used in many varied situations. As one skilled in the art will readily appreciate, the system 10 of the present invention is readily transportable to provide tutorial instruction in any computer based system.

The interaction between the system components, as well as the communication flow thereof, are preferably implemented as follows. The expandable supplied resources thesaurus 201 provide resources to be manipulated by the student within the student's activity center 202 and the teacher's resources design center 203. A teacher can expand or modify existing thesaurus resources to better suit educational or entertainment goals. These modifications can be permanently stored in the resources thesaurus 201. The term "thesaurus" as used herein is meant for a resources data container having a set of default, sample or teacher modified resources "played" by the student's activity center 202. Examples of such resource data is video-clips, audio, images, stories, quizzes, or the like. The resource manipulations are provided for by the goal-oriented program contents and features. These resources are provided in conventional formats that can be manipulated by the system. For example, such formats are AVI ("Audio/Video Interleave") video clips, bit-mapped images, wave sounds, and clipart. These resource can be modified or created from existing resources from the teacher's activity center 203 through application programs or their interfaces.

The resources in thesaurus 201 can be called on demand by a student, and are provided to a resources filter 204. The teacher can configure the resources filter 204 to block or to prevent a student's access to resources within the thesaurus 201.

The student's activity center 202 is a default, self-contained set of goal-oriented programs, or interfaces to such programs used in a learning process. For example, the programs or programs interfaces have games, stories, puzzles, quizzes, coloring books or the like. Preferably, students, upon exiting the system, can save their current working/learning environment to a file that can be password protected. It should be noted that goal-oriented programs means those programs having learning thresholds or objectives, such as educational programs or entertainment programs having intermediate or sole learning objectives.

providing rewards to the student. When such goals or other triggering events occur, the rewards agent 206 is triggered by the student's-activity monitor agent 205.

The execution and tutorial agent 207 instructs or tutors the student or the teacher on the system's operation. Tutorial instructions are provided by audio/video clips and written text, and by direct, automatic execution of the desired functions on the screen. The tutorial agent 207 can be activated upon demand or upon an error by the student's activity center 207, and operates according to the configuration loaded from the teacher's activity center 203. The tutorial agent 207 is activated upon demand by the teacher .

The tutorial agent 207 can also serve to provide execution functions that can operate or control specific different components of the system described herein. That is, the tutorial agent can be an activity agent to override the teacher or the student user interfaces 207 and 203, respectively. For example, the tutorial agent 207 can be used to input different yet specific religious, social, family or health related information such as history, values, known facts, or the like, targeted to the student user's specific learning curriculum. For a further example, the tutorial agent 207 can be programmed to operate or control the rewards agent 206, student activities monitor 205, or the resources filter 204, independently or in combination.

The visibility of system component's differs between components. The resources filter 204, the student's activity monitor 205 and the rewards agent 206 are normally hidden, except when in a configuration mode or when an error occurs. That is, the resources filter 204, the student's activity monitor 205 and the rewards agent 206 operate in the background of the system's interface. Configuration by the teacher takes place from within the teacher's activity center 203. The remaining components are visibly present in, and directly callable from, the system interface.

What we Claim is:

1. An computer-implemented tutorial system configurable by a teacher and for teaching a student, the system comprising:
 - a resource thesaurus having a plurality of executable goal-oriented programs
 - 5 configurable by a student or a teacher;
 - a student user interface component for transmitting a first set of instructions to the student and for receiving selected instructions from the student, said selected instructions based upon at least one goal-oriented program of said plurality of goal-oriented programs, said selected instructions designating at least one goal-oriented program from said
 - 10 plurality of goal-oriented programs;
 - a teacher user interface for interfacing with said resource thesaurus, said teacher user interface transmitting a second set of instructions to the teacher and for receiving selected instructions from the teacher with respect to a goal-oriented program from said plurality of goal-oriented programs, said selected instruction for modifying said
 - 15 teacher selected goal-oriented program; and
 - an execution and tutorial agent for transforming student or teacher instruction into actions on said student user interface or said teacher user interface for executing or demonstrating a function of the system.
2. The system of Claim 1, further comprising :
 - a resource filter component between said resource thesaurus and said student user interface component, said resources filter configurable by the teacher for selectively limiting the student's access to said resource thesaurus.

9. The system of Claim 3, wherein said student user interface component further comprises:
a network interface for remote access to said resources thesaurus.

10. The system of Claim 3, wherein said teacher user interface component further comprises:
network interface to access remote resources thesaurus to retrieve resources.

11. An computer-implemented tutorial system configurable by a teacher and for teaching a student, the system comprising:
a resource thesaurus having a plurality of executable goal-oriented programs configurable by a student or a teacher;
5 a student user interface component for transmitting a first set of instructions to the student and for receiving selected instructions from the student, said selected instructions based upon at least one goal-oriented program of said plurality of goal-oriented programs, said selected instructions designating at least one goal-oriented program from said plurality of goal-oriented programs;
10 a teacher user interface for interfacing with said resource thesaurus, said teacher user interface transmitting a second set of instructions to the teacher and for receiving selected instructions from the teacher with respect to a goal-oriented program from said plurality of goal-oriented programs, said selected instruction for modifying said teacher selected goal-oriented program; and
15 an execution and tutorial agent for controlling each of said student user interface, said teacher user interface and said resource thesaurus for executing a function of the system.

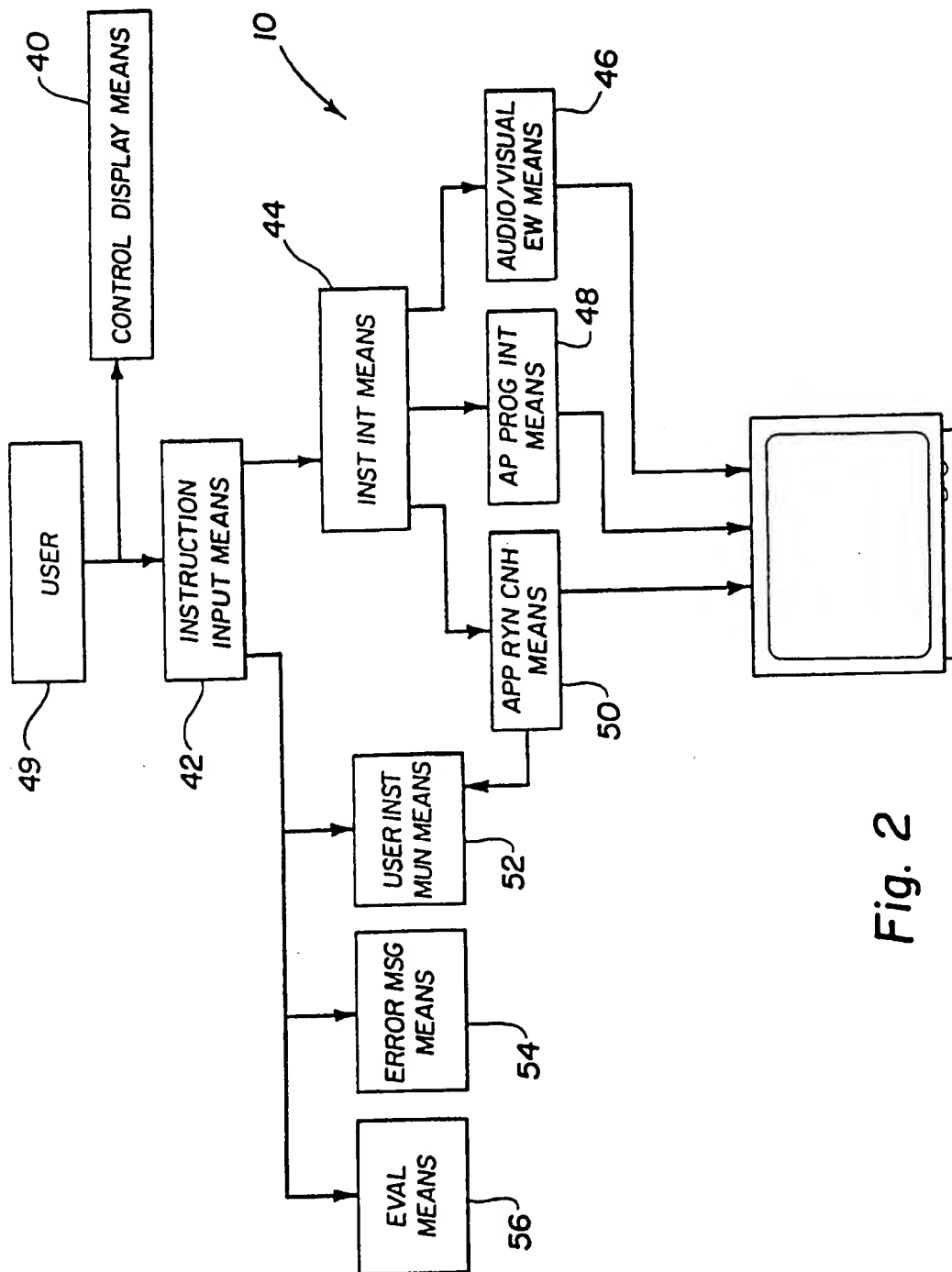


Fig. 2

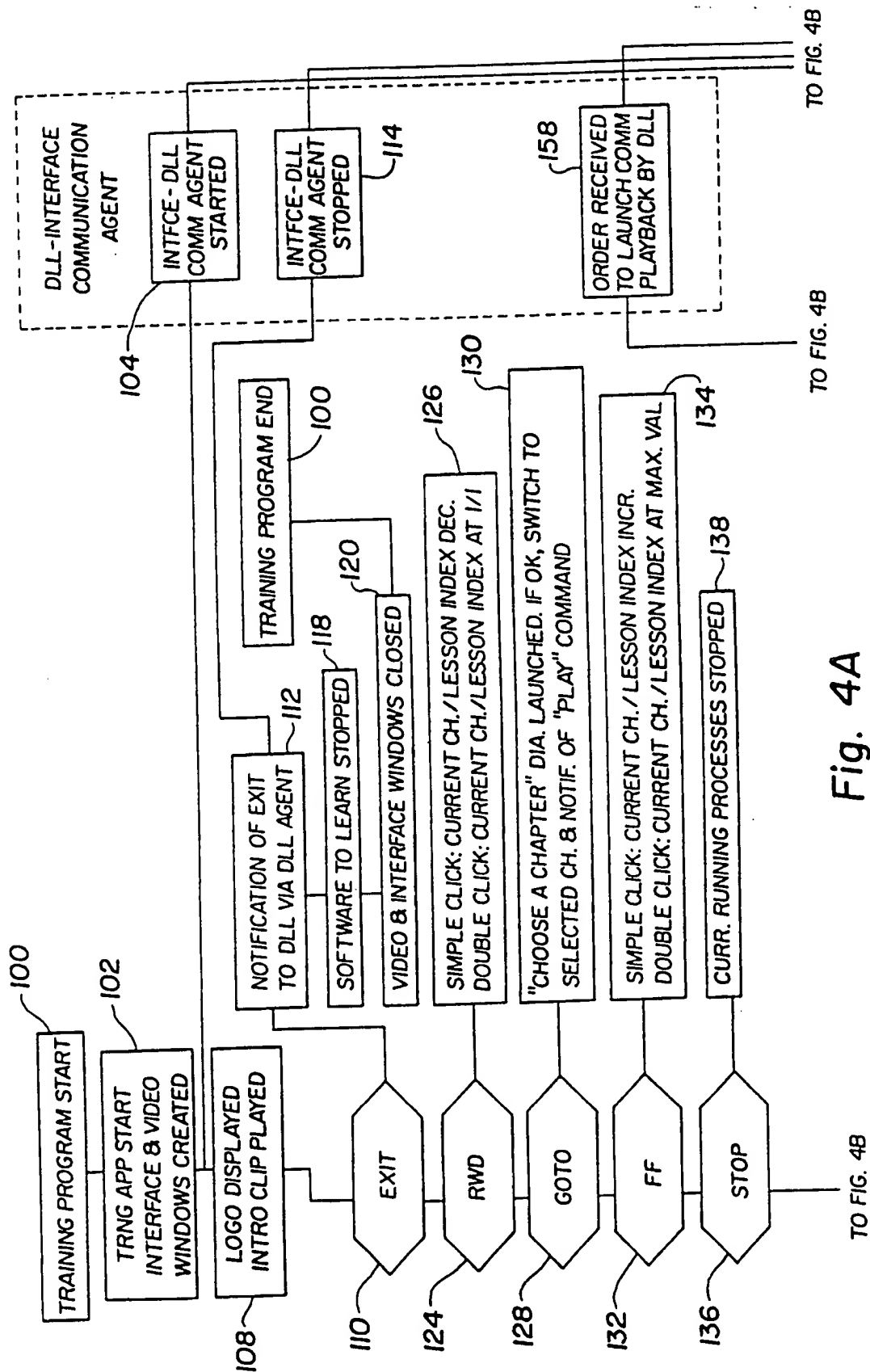


Fig. 4A

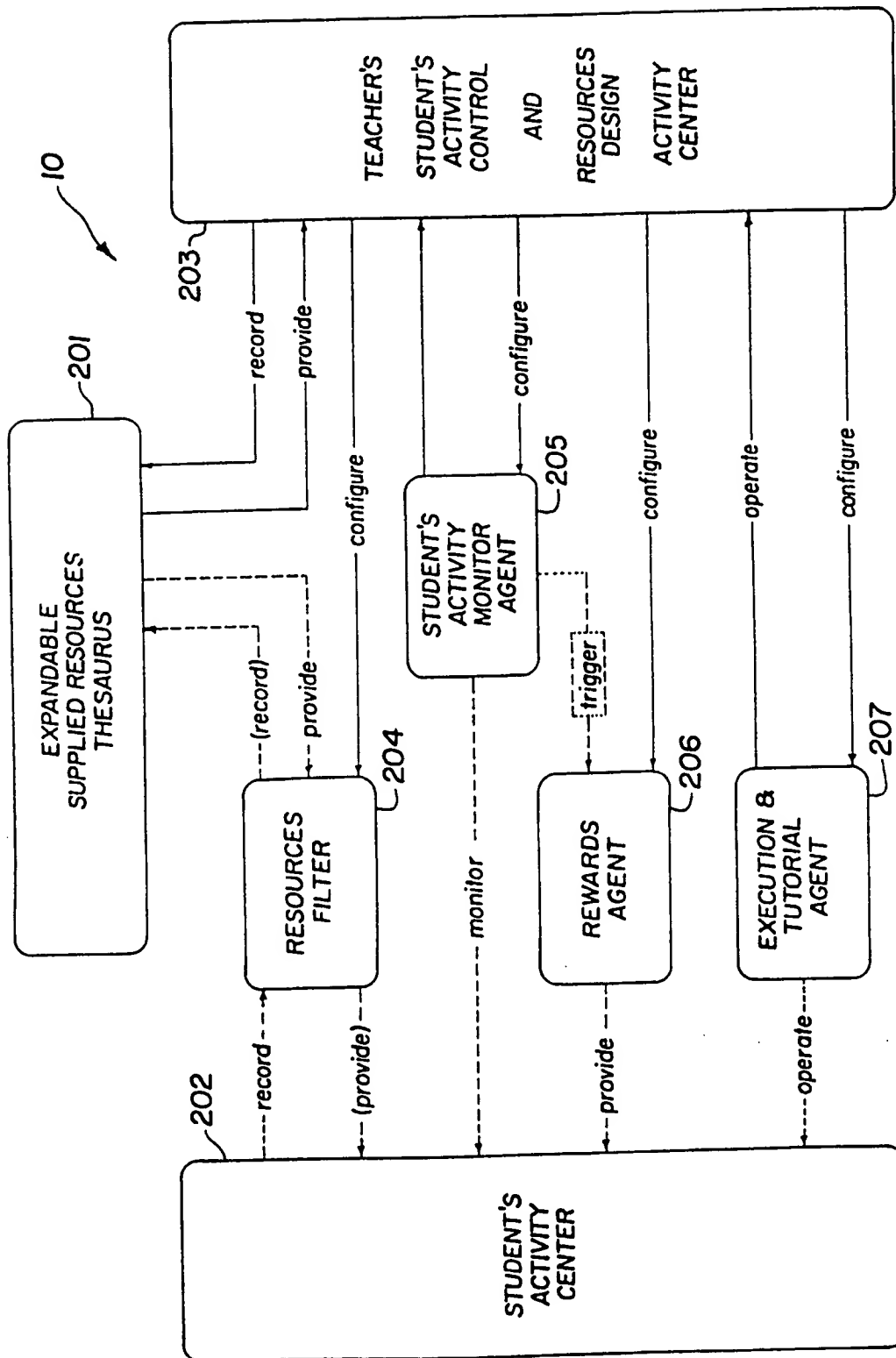


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/18421

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, 5,537,618 (BOULTON ET AL) 16 JULY 1996, COLS. 1-2.	1
Y	US, 5,377,319 (KITAHARA ET AL) 27 DECEMBER 1994, FIGS. 16A-17.	1-11
Y	US, 5,395,243 (LUBIN ET AL) 07 MARCH 1995, FIGS. 8-9.	1-11